according to the following method in compliance with "JIS-K-7060 Barcol Hardness".

(1) The surface hardness of the above casting plate was measured using the Model GYZJ-934-1 hardness meter and Model GYZJ-935 hardness meter manufactured by the US's Barber-Colman Corp. At that time, the hardness obtained from the Model GYZH-934-1 hardness meter was taken to be the HBI-A value, or "Barcol hardness A value", while the hardness obtained from the Model GYZJ-935 hardness meter was taken to be the HBI-B value, or "Barcol hardness B value".

(2) Measurements were performed for at least 10 points for the above casting plate. The average values of each of the measurement results were designated as "Barcol hardness (A value)" and "Barcol hardness (B value)", respectively.

Heat Deflection temperature

The technical term, Heat Deflection temperature, refers to the "Heat Deflection temperature" measured according to the following method in compliance with "JIS-K-7207 Heat Deflection temperature".

(1) Production of Test Piece

A short piece measuring 130 mm or more in length, 12.7 mm in width, and 3.0±0.2 mm thick was cut out of the above casting plate and used as the test piece followed by sanding the cut edges of the test piece with #400 to #800 sandpaper.

(2) Preparations for Measurement

The above test piece was placed upright in the direction of width to a height of 12.7 mm and immersed in an oil bath on a support stand having a span of 100 mm. When the load applied to the central portion of the above test piece was designated as P, P (kg) = 2 x 18.5 x [width(0.3±0.02 cm)] x [height (1.27 cm)]^2/[3 x 10 cm] - (loading jig kg). This load was applied to the central portion of the test piece, and a dial gauge that detects the deflection of the test piece through the loading jig was installed.

(3) A thermometer was placed in the oil bath in close proximity to the central portion of said test piece in order to measure oil temperature during the occurrence of deflection in the test piece.

(4) Measurement

The oil temperature when the oil temperature in the oil bath was raised at the rate of +2°C/min. and the dial gauge indicated a deflection value of 0.26 mm was taken to be

the "Heat Deflection temperature ".

The following provides an explanation of the surface layer (A), intermediate layer (B), and fiber-reinforced plastic layer (C) that compose the fiber-reinforced plastic molded article according to one embodiment of the present invention.

The surface layer (A) is preferably composed of a polymer material that demonstrates stable surface smoothness with respect to temperature changes, namely has superior smoothness that is unaffected by temperature changes. It is preferably formed with a coating, film, or cured gelcoat resin. The coating may be formed, for example, by coating a coating material such as acrylic resin, epoxy resin, urethane acrylic resin or polyester resin onto the intermediate layer (B) by a means such as spraying. In addition, the film may be a plastic film made of, for example, polyester, polyolefin, polyvinyl chloride, or polyacrylate, and is preferably colored. The cured gelcoat resin may be formed in the form of a cured product layer having a thickness of 0.1 to 1.0 mm, and preferably 0.3 to 0.5 mm, by spraying a gel coating material including a polymerization curable resin composition able to be cured at normal temperature to be described later onto a separation-treated mold surface with a sprayer. This cured gelcoat resin is preferably used from the viewpoints of high productivity and high performance of the fiber-reinforced plastic molded article of the present invention. Furthermore, in the case the surface layer (A) is the film, the surface layer (A) is preferably joined with the intermediate layer (B) by placing a primer layer or an adhesive layer in between the surface layer (A) and the intermediate layer (B).

The polymerization curable resin composition used for the above surface layer (A) is a curable unsaturated resin composition that is a liquid at normal temperature and which has for its main component a polymerization curable unsaturated resin, which is selected according to performance and the application, from a group including unsaturated polyester, epoxy(meth)acrylate, urethane(meth)acrylate, unsaturated polyesteracrylate, and mixtures thereof to be described later, and a polymerizable unsaturated monomer to be described later. Moreover, silicon oxide (SiO_2), having a silanol group and represented by fumed silica, an inorganic bentonite compound, or the like is mixed as a thixotropic agent into the curable unsaturated resin composition to give thixotropic properties to the resin composition, and the resin composition may be colored as necessary by adding

pigment.

Examples of commercially available products of this curable resin composition include gel coated materials such as Polylite GC-130, GC-230, GC-251, GC-505 and GC-560 (all products are manufactured by DAINIPPON INK AND CHEMICALS, INC.).

The surface layer (A) may be of a single color, transparent, translucent, partially transparent, or partially translucent, and there are no particular restrictions on the presence or absence of coloring, design, pattern or other decorative means.

The intermediate layer (B) is composed of a cured product of an intermediate layer composition not including a fiber-reinforcing material but including a curable resin composition containing a polymerizable unsaturated monomer and a polymerization curable unsaturated resin, a filler, and a thixotropic agent. The intermediate layer composition preferably contains 30 to 150 parts by weight of filler and 1 to 4 parts by weight of thixotropic agent, relative to 100 parts by weight of the curable resin composition containing the polymerizable unsaturated monomer and the polymerization curable unsaturated resin. The above curable resin composition is capable of forming a casting plate having a tensile elongation percentage of 2 to 50% and a Barcol hardness (B value) of 50 or more due by its curing. The Barcol hardness (B value) is able to indicate hardness ranging from that which is comparatively soft to that which is comparatively hard. The Barcol hardness (B value) can also be indicated with Barcol hardness (A value). The above curable resin composition is preferably capable of forming a casting plate having a tensile elongation percentage of 2 to 50% and Barcol hardness (A value) of 30 or more by its curing. Moreover, a curable resin composition is even more preferable that is capable of forming a casting plate having a Heat Deflection temperature of 60°C or more and a tensile strength of 10 MPa or more by its curing.

The polymerization curable unsaturated resin used in the intermediate layer (B) is preferably unsaturated polyester, epoxy(meth)acrylate, urethane(meth)acrylate or a mixture thereof. The curable resin composition is preferably a liquid at normal temperature that contains polymerization curable unsaturated resin at 45 to 75 wt% and polymerizable unsaturated monomer at 65 to 25 wt%. A casting plate obtained by adding curing accelerator and curing agent to the curable resin composition followed by curing has a tensile elongation percentage of 2 to 50%, preferably 3 to 20%, and more preferably 3 to 10%. In addition, the tensile strength of that casting plate is 10 MPa or more, and